Thalamic Involvement and Its Impact on Clinical Disability and Cognition in Patients with Multiple Sclerosis, A clinical and Diffusion Tensor Imaging Study.

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By

Ahmed Mohamed Ezzat Ibrahim Metwally Dahshan
M.B.B.Ch
Resident of neurology
Cairo University

Supervised by

Prof. Dr.Ahmed Talaat Al Ghoneimy
Professor of Neurology
Cairo University

Dr.Amr Hasan El Hasany
Lecturer of Neurology
Cairo University

Dr. Mohamed Darwish Homos
Lecturer of Radiodiagnosis
Cairo University

Department of Neurology
Faculty of Medicine
Cairo University

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عن مناقشة رسالة الماجستير الخاصة بالطبيب / أحمد محمد عزت ابراهيم متولي دهشان

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1- الاستاذ الدكتور / احمد طلعت الغنيمي – أستاذ الامراض العصبية – كلية الطب – جامعة القاهرة (عن المشرفين)

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عنوان الرسالة : التورط المهادي وتأثيره على الحجز السريري والإدراك في مرضى التصلب العصبي المتناثر ، دراسة سريريه وتصويرية بالرنين المغناطيسي المنتشر الموتر.

وبينت الدراسة : وجود تأثر بمنطقة المهاد في المرضى عنهم في الاصحاء ، ووجود علاقة بين هذا التأثر والقدرات الادراكية والاعاقة البدنية في هؤلاء المرضى ، كما بينت مدى اهمية التصوير بالرنين المغناطيسي المنتشر الموتر ودوره في الكشف عن الاصابة حتى في حالة عدم ظهورها بالرنين المغناطيسي العادي.

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أ.د. أحمد طلعت الغنيمي

أ.د. حاتم سمير محمد

أ.د. طه كامل علوش

بسم الله الرحمن الرحيم

(وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ

وَكَانَ فَضْلُ اللهِ

عَلَيْكَ عَظِيمًا)

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ABSTRACT

Background and purpose: Grey matter involvement is suggested to have a role in pathophysiology of MS. Diffusion tensor imaging (DTI) at 1.5T was used to investigate the presence of damage to the normal-appearing thalamus in MS and its relationship with cognitive impairment, clinical disability and fatigue.

Methods: 31 patients with MS (23 RRMS and 8 SPMS) with mean age 34.4± 8.5 SD were studied. 18 age, sex and education level matched healthy controls were recruited. They all underwent clinical assessment, neuropsychological assessment and radiological assessment using 1.5 T DTI. Fractional anisotropy (FA) and apparent diffusion coefficient (ADC) were measured over regions of interest over the thalamus. Comparisons and correlations were made between patients and controls concerning clinical and radiological data.

Results: Patients with MS had higher thalamic FA (***p*=<0.001**) and ADC (***p*=<0.001**) than volunteers. Patients showed worse performance in all neuropsychological tests than controls except in MMSE. Performance in CVLT-II-SR was correlated with mean ADC over left thalamus (***p*=0.038).** There was significant correlation between total EDSS and Mean thalamic FA. Also there were correlations between disease duration, number of attacks and mean FA over the thalamus. There were significant correlations between performance in neuropsychological tests and disease duration, number of attacks and total EDSS. Regarding fatigue, SPMS patients were more fatigued than RRMS patients (***p*=0.002).** FSS had significant correlations with disease duration, number of attacks and total EDSS.

Conclusion: DTI was able to detect abnormalities in normal-appearing thalamus of patients with MS. Thalamic involvement had significant relations with cognitive impairment and clinical disability in patients with MS.

Key words: multiple sclerosis, thalamus, cognitive impairment, fatigue, DTI.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

25(OH)D	25- hydroxyvitamin D
3DFFE	3D Fast Field Echo
AD	Axial diffusivity
ADC	Apparent diffusion coefficient
APCs	Antigen presenting cells
BDNF	Brain-derived neurotrophic factor
BVMT-R	Brief Visuospatial Memory Test–Revised
CC	Corpus Callosum
CD	Cluster of differentiation
CI	Cognitive impairment
CIS	Clinically isolated syndrome
COWAT	Controlled Oral Word Association Test
CSF	Cerebrospinal fluid
CST	Corticospinal tract
CVLT-II	California Verbal Learning Test- 2nd edition
DIR	Double inversion recovery
DM	Diabetes mellitus
DMN	Dorsomedial nucleus
DTI	Diffusion tensor imaging
DW	Diffusion weighted

EAE	Experimental autoimmune encephalomyelitis
EDSS	Expanded Disability Status Scale
FA	Fractional anisotropy
FIS	Fatigue Impact Scale
FLAIR	Fluid attenuated inversion recovery
fMRI	Functional magnetic resonance imaging
FSS	Fatigue Severity Scale
Gd	Gadolinium
GEL	Gadolinium-enhancing lesions
GM	Grey matter
HLA	Human leukocyte antigen
HTN	Hypertension
ICAM	Intracellular adhesion molecule
IFN	Interferon
Ig	Immunoglobulin
IL	Interleukins
LD	Lateral dorsal nucleus
LGN	Lateral geniculate nucleus
LP	Lateral posterior nucleus
MD	Mean diffusivity
MGN	Medial geniculate nucleus

MMSE	Mini-Mental State Examination
MRI	Magnetic resonance imaging
MRS	Magnetic resonance spectroscopy
MS	Multiple Sclerosis
NAA	N-acetyl aspartate
NAGM	Normally appearing grey matter
NAWM	Normally appearing white matter
NKT	Natural killing T cells
NO	nitric oxide
OCBs	Oligoclonal bands
OCT	Optical coherence tomography
OPCs	oligodendrocyte precursor cells
PASAT	Paced Auditory Serial Addition Task
PET	Positron emission tomography
PPMS	Primary progressive multiple sclerosis
PRMS	Progressive relapsing multiple sclerosis
rCBF	Regional cerebral blood flow
RD	Radial diffusivity
RNFL	Retinal nerve fiber layer
ROI	Region of interest
ROS	Reactive oxygen species

RRMS	Relapsing-Remitting multiple sclerosis
SD	Standard deviation
SDMT	Symbol Digit Modalities Test
SPECT	Single photon emission computerized tomography
SPMS	Secondary progressive multiple sclerosis
SPSS	Statistical Package of Social Science Software
TGF	Transforming growth factor
TH	T Helper cells
TNF	Tumor Necrosis Factor
Tr	Tregs cells
TYK	Tyrosine kinase
VA	Ventral anterior nucleus
VCAM	vascular-cellular adhesion molecule
VEP	visual evoked potentials
VL	Ventral lateral nucleus
VPL	Ventral posterolateral nucleus
VPM	Ventral posteromedial nucleus
WM	White matter

LIST OF FIGURES

LIST OF TABLES